

UNCLASSIFIED

**Defense Technical Information Center
Compilation Part Notice**

ADP013853

TITLE: A Spatial Disorientation Survey of Hellenic Air Force Pilots

DISTRIBUTION: Approved for public release, distribution unlimited

Availability: Hard copy only.

This paper is part of the following report:

TITLE: Spatial Disorientation in Military Vehicles: Causes, Consequences and Cures [Desorientation spaiale dans les vehicules militaires: causes, consequences et remedes]

To order the complete compilation report, use: ADA413343

The component part is provided here to allow users access to individually authored sections of proceedings, annals, symposia, etc. However, the component should be considered within the context of the overall compilation report and not as a stand-alone technical report.

The following component part numbers comprise the compilation report:

ADP013843 thru ADP013888

UNCLASSIFIED

A Spatial Disorientation Survey of Hellenic Air Force Pilots

Br.Gen. Elias Chimonas MD

HAF Center of Aviation Medicine (HAFCAM)

251 HAFGH complex, 3 P. Kanelopoulou Str. Cholargos, Athens GR-115 25, Greece

Maj. Ioannis Diamantopoulos MD

Office for Aviation Medicine

Preventive Medicine Division/

HAFGS Medical Directorate

251 HAFGH complex

3 P. Kanelopoulou Str. Cholargos

Athens GR-115 25, Greece

Cpt Ioannis Markou MD

Br.Gen. Evangelos Stathogiannis MD

HAF 251 General Hospital

251 HAFGH complex

3 P. Kanelopoulou Str. Cholargos

Athens GR-115 25, Greece

SUMMARY

Introduction: Spatial disorientation (SD) continues to be a largely unyielding problem in military and civilian aviation. SD training remains the sole solution of coping with this effect. In order to have more efficient training, we asked pilots the illusion they have probably had experienced in their flying career, attempting to study the prevalence and incidence rates of illusions and their correlation with specific types of aircraft

Method: An anonymous questionnaire was distributed to pilots of Hellenic Air Force during their annual physical examination at Hellenic Air Force Center of Aviation Medicine, between December 2000 and June 2001. The questionnaire gathered information such as age, type of aircraft flown, flying experience. The pilots were asked to give the number of times they experienced each of the listed illusions. Statistical analysis was performed by using SPSS 8.0

Results: A total of 407 surveys were collected. The mean age of the participants was 31.4 ± 5.4 years old, and their flying experience 1012 ± 908 hours. The most common types of aircraft flown were F4 and A7. 140 pilots (34.4%) answered that they had never experienced any kind of illusion. Among the other 267 pilots, 71 reported that they had experienced 1 illusion (26.6%), 185 (69.3%) had experienced 2-10 different types of illusions and 11 above 10 different types of illusions (4.11%). The top 5 illusions reported were the leans (47.2%) primarily with F4, the Coriolis illusion (39%) primarily with F4, blending of earth and sky (38.2%) primarily with F4 and A7, flight instrument reversal (24.3%) primarily with F4 and sloping clouds or terrain (22.8%) primarily with F16 and A7. When asked to report their most personally critical illusion, 185 pilots responded. They classified the severity of their illusion to flight safety 111 (60%) as minor, 68 (36.75%) as significant and 6 (4.9%) as severe.

INTRODUCTION

Spatial disorientation (SD) continues to be a largely unyielding problem in military and civilian aviation. SD training remains the sole solution of coping with this effect. In order to have more efficient training, we asked pilots the illusion they have probably had experienced in their flying career, attempting to study the prevalence and incidence rates of illusions and their correlation with specific types of aircraft.

MATERIALS-METHODS

An anonymous questionnaire was distributed to pilots of Hellenic Air Force during their annual physical examination at Hellenic Air Force Center of Aviation Medicine, between December 2000 and June 2001. 407 pilots, all of which were men, served as participants. All of them were active-duty pilots.

A SD questionnaire was developed from a previous study (5). The questionnaire gathered information such as age, type of aircraft flown, flying experience. The pilots were asked to give the number of times they experienced each of the listed illusions. Each illusion was followed by a short definition. The pilots were also asked to report their most personally critical illusion. Statistical analysis was performed by using SPSS 8.0.

RESULTS

A total of 407 surveys were collected.

The mean age of the participants was 31.4 ± 5.4 years old, and their flying experience 1012 ± 908 hours.

The most common current aircrafts flown were F4 and A7 (18,2% and 16,1% retrospectively).

140 pilots (34.4%) answered that they had never experienced any kind of illusion.

Among the other 267 pilots, 71 reported that they had experienced only 1 type of illusion (26.6%), 185 (69.3%) had experienced 2-10 different types of illusions and 11 above 10 different types of illusions (4.11%). The top 5 illusions reported were the leans (47.2%) primarily with F4, the Coriolis illusion (39%) primarily with F4, blending of earth and sky (38,2%) primarily with F4 and A7, flight instrument reversal (24.3%) primarily with F4 and sloping clouds or terrain (22.8%) primarily with F16 and A7.

When asked to report their most personally critical illusion, 185 pilots responded. The top 5 illusions reported were the leans (23.8 %), the Coriolis illusion (12.97%), blending of earth and sky (11.9 %), sloping clouds or terrain (7.56%) and flight instrument reversal (7%).

When asked to classified the severity of their illusion to flight safety, 111 participants (60%) classified it as minor, 68 (36.75%) as significant and 6 (4,9%) as severe.

Almost all pilots reported that the tools that were used to recover from the illusion were their instruments.

DISCUSSION

The knowledge of the type of the most common experienced illusions and their correlation with specific type of aircraft flown or mission, will help having more realistic and effective training on which illusions to expect.

REFERENCES

1. Braithwaite MG, Durnford SJ, Crowley JS, Rosado NR, Albano JP.: Spatial disorientation in U.S. Army rotary-wing operations. *Aviat Space Environ Med.* 1998 Nov;69(11):1031-7.
2. Knapp CJ, Johnson R.: F-16 Class A mishaps in the U.S. Air Force, 1975-93. *Aviat Space Environ Med.* 1996 Aug;67(8):777-83.
3. Collins DL, Harrison G.: Spatial disorientation episodes among F-15C pilots during Operation Desert Storm. *J Vestib Res.* 1995 Nov-Dec;5(6):405-10.
4. Sipes WE, Lessard CS: A Spatial Disorientation Survey of Experienced Instructor Pilots. *IEEE Eng Med Biol Mag.* 2000 Mar-Apr;19(2):35-40.
5. Tredici, T .J . Visual illusions as a probable cause of aircraft accidents. *Spatial Disorientation in Flight: Current Problems.* AGARD-CP-287. North Atlantic Treaty Organization, Neuilly-sur-Seine, France, 1980.
6. Barnum, F ., and Bonner, R.H.: Epidemiology of USAF spatial disorientation aircraft accidents, 1 Jan 1958-31 Dec 1968. *Aerospace Med.* 42:896-898, 1971.
7. Lyons, T.J., and Freeman, J.E.: Spatial disorientation (SD) mishaps in the US Air Force-1988. *Aviat. Space Environ. Med.* 61:459 (abstract), 1990.
8. Kirkham, W .R., et al.: Spatial disorientation in general aviation accidents, *Aviat. Space Environ. Med.* 49:1080-1086, 1978.